

LITERATURE CITED

- GREENE, E. L. 1888. New or noteworthy species II. *Pittonia* 1:159-178.
- KELLOGG, A. 1863. *Allium attenuifolium*. Proc. Calif. Acad. Sci., I, 2:110.
- MCNEAL, D. W. 1970. Comparative studies of the *Allium acuminatum* alliance. Ph.D. Thesis, Washington State Univ., Pullman.
- and M. OWNBEEY. 1973. Bulb morphology of some western North American species of *Allium*. *Madroño* 22:10-24.
- SAGHIR, A. R. B., L. K. MANN, M. OWNBEEY, and R. Y. BERG. 1966. Composition of volatiles in relation to taxonomy of American alliums. *Amer. J. Bot.* 53: 477-484.
- TORREY, J. 1856. Description of the general botanical collections of the route near the 35th parallel explored by Lieut. A. W. Whipple 1853-1854. U.S. War Dept. Rep. on explorations and surveys for a railroad from the Mississippi River to the Pacific Ocean, 4(Botany).
- WATSON, S. 1871. Report of the geological exploration of the Fortieth Parallel. Vol. 5. Govt. Print. Off., Wash., D.C.
- . 1879. Contributions to American botany. IX. Revision of the North American Liliaceae. Proc. Amer. Acad. Arts 14:213-288.

RE-ESTABLISHMENT OF THE GENUS HYBRIDELLA (ASTERACEAE: HELIANTHEAE)

JOHN OLSEN

Department of Botany, University of Texas, Austin 78712

Hybridella is a small genus of three herbaceous perennial taxa native to Mexico. It was treated as a subgenus of *Zaluzania* by Robinson and Greenman (1899) and by Sharp (1935), although it was described as a genus by Cassini in 1821. During a study of *Zaluzania* (Olsen, 1977), I became aware that *Hybridella* comprises a cohesive unit phylogenetically remote from *Zaluzania*. Based on morphological, cytological, and ecological data, it should be positioned elsewhere. Table 1 lists major differences between the two genera.

There are only two chromosome counts available for *Hybridella*: *H. globosa* var. *globosa* ($n = 16$, Powell and Turner, 1963) and *H. globosa* var. *myriophylla* ($n = 16$, Olsen 265, LL, published here). These counts suggest a base number of $x = 16$ for the genus.

The most likely relationships of *Hybridella* are with *Heliomeris*, a *Viguiera* segregate (Yates, 1967). The base chromosome number of *Heliomeris* is $x = 8$ (Turner, 1976), presumably one of the ancestral numbers in the Heliantheae (Stuessy, 1976). It is likely that the ancestral base number for *Hybridella* is $x = 8$, with stabilization occurring at the tetraploid level. This coupled with the obvious floral similarities between *Hybridella* and *Heliomeris* (Table 1), suggests a close relationship between the two taxa.

TABLE 1. COMPARISON OF *HYBRIDELLA*, *ZALUZANIA*, AND *HELIOMERIS*

<i>HYBRIDELLA</i>	<i>ZALUZANIA</i>	<i>HELIOMERIS</i>
1. Base chromosome number, $x = 16$	Base chromosome number, $x = 18$	Base chromosome number, $x = 8$
2. Leaves pinnatisect	Leaves entire to tripartite, never pinnatisect	Leaves entire or serrate, never pinnatisect
3. Receptacle globose to hemispheric	Receptacle conical	Receptacle hemispheric
4. Tube of disc corolla pubescent with glandular hairs	Tube of disc corolla glabrous or with simple multicellular hairs	Tube of disc corolla may be glandular
5. Ray florets (always present) 15–20, ligule supplied by 5–7 principal veins.	Ray florets (when present) 8–10, ligule supplied by 10–12 principal veins	Ray florets (always present), ca 13, ligule supplied by usually 7 principal veins
6. Ligule of ray floret 2-lobed, usually with 3 basal lobes	Ligule or ray floret (2–)3-lobed, without basal lobes	Ligule of ray floret entire to 2-lobed without basal lobes
7. Plants generally occupying wet habitats; marshy soils; sandy riverbanks, etc.	Plants generally occupying dry habitats; <i>Larrea</i> flats, pine oak forests, etc.	Plants generally occupying dry rocky habitats; exposed mountain slopes, dry plains, etc.

Hybridella may also be related to *Viguiera* sect. *Chloracra* series *Pinnatilobatae*. The habit and leaf morphology, especially of *H. anthemidifolia*, resemble that found in *V. stenoloba*, a highly variable taxon with respect to leaf morphology (Butterwick, 1975); however, the absence of a pappus and the presence of fertile ray florets in *Hybridella* serve readily to distinguish the two.

In summary, I consider *Hybridella* to be more closely related to *Heliomeris* and elements of *Viguiera* than to *Zaluzania*; however, it is sufficiently distinct from both to deserve generic status.

TAXONOMIC TREATMENT

HYBRIDELLA Cass., Dict. Sci. Nat. 22:86. 1821. TYPE: *Anthemis globosa* Ort.

Herbaceous perennials with 1–4 stems arising from a woody caudex. Plants less than 1 m tall, stems striate, usually glabrous at the base, becoming pubescent above. Leaves alternate, sessile, usually obtrullate in outline, pinnatifid, glabrous on upper surface or with a few hairs on the veins, pubescent beneath. Heads one to several; solitary on well developed peduncles. Involucre of 2–3 series; bracts ovate-elliptic to lanceolate; outer series larger than the inner, pubescent with simple multicellular hairs. Receptacle globose or hemispherical. Chaff present,

the pales oblanceolate to linear, herbaceous or subherbaceous. Ray florets pistillate and fertile, 15–20 per head; corollas yellow, glandular along the tube, ligule usually 2-lobed, often with 2 lateral lobes at the base with a smaller central lobe (Fig. 1b). Disc florets numerous, bisexual, fertile; corollas yellow, base of the tube expanded. Ray achenes three-angled in cross section, black, glabrous to sparsely pubescent, epappose. Disc achenes four-angled in cross section, black, glabrous to sparsely pubescent, epappose. Base chromosome number, $x = 16$.

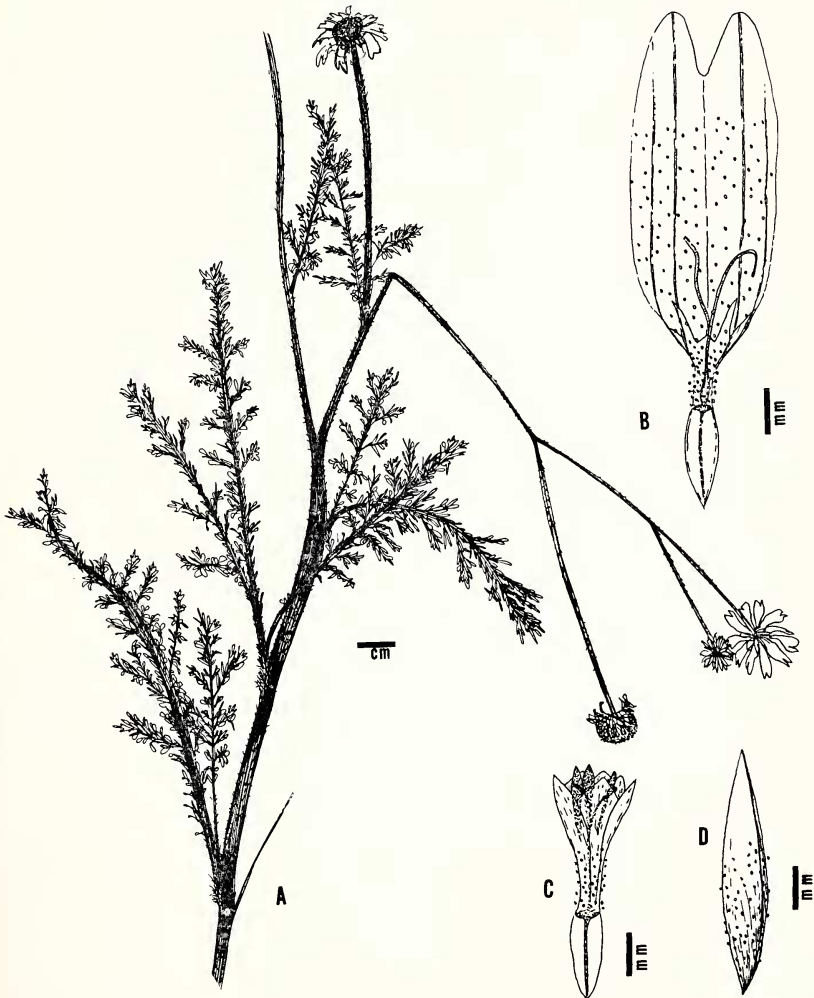


FIG. 1. *Hybridella globosa* var. *myriophylla*. A, habit. B, ray floret illustrating the lateral and basal lobing of the corolla. C, disc floret. D, receptacular chaff. Drawings from Olsen 265, LL.

Key to *Hybridella*

- Plants decumbent; leaves 2–3-pinnatifid, ultimate segments
 1–2 mm broad. 1. *H. anthemidifolia*
- Plants erect; leaves 4-pinnatifid, ultimate segments less
 than 1 mm broad.
- Ultimate leaf segments acute, more than
 2 mm long. 2a. *H. globosa* var. *globosa*
- Ultimate leaf segments obtuse or rounded,
 less than 2 mm long. 2b. *H. globosa* var. *myriophylla*

1. ***Hybridella anthemidifolia*** (Rob. & Greenm.) Olsen, comb. nov.
Zaluzania anthemidifolia Rob. & Greenm., Proc. Amer. Acad. 34:531.
 1899. TYPE: Mexico, Jalisco, wet sandy riverbanks near Guadala-
 ajara, 23 Sep 1891, *Pringle 5156* (Holotype: GH!).

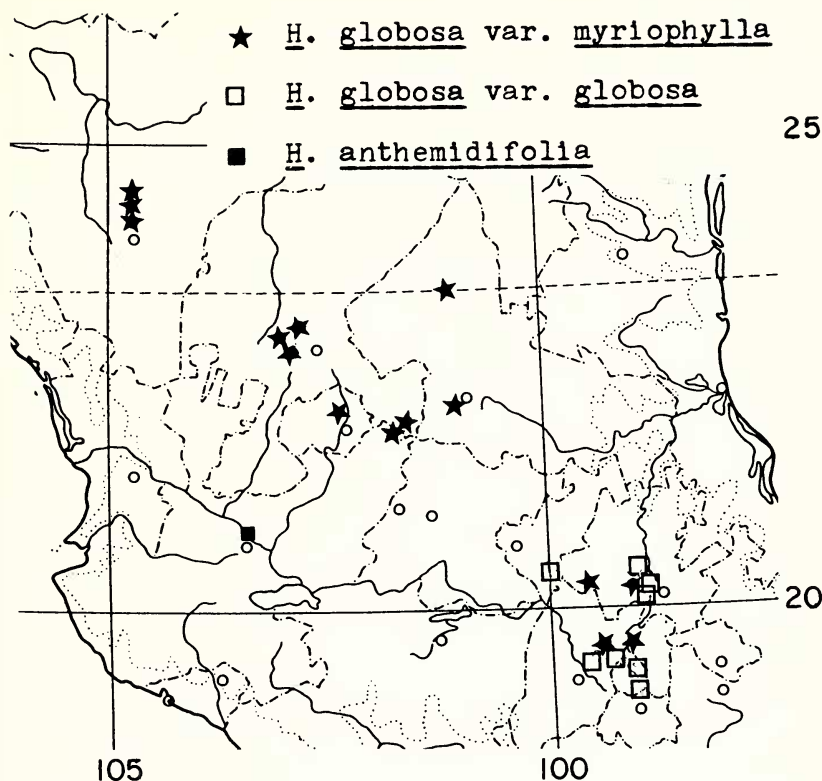
Herbaceous perennials with one to few stems arising from a decumbent woody caudex. Plants to 0.6 m tall; stems striate, glabrous below to sparsely pubescent with simple multicellular hairs above. Leaves sessile, elliptic in outline, 2–3-pinnatifid, ultimate segments 1–2 mm broad. Lower leaves usually absent; upper leaves 4.3–7.0 cm long, 1.8–2.6 cm wide. Upper surface of the leaves glabrous, lower surface with scattered long, thin multi-cellular hairs. Heads 1–3, solitary on peduncles 1.2–4.0 cm long; 2.0–2.6 cm wide including the rays. Involucre of 2–3 series of ovate elliptic bracts; outer series 4.2–7.0 mm long, 2.2–3.1 mm wide; inner series 3.6–3.7 mm long, 1.1–1.7 mm wide. Pales oblanceolate with base wrapped around the base of the disc achenes, 2.9–3.0 mm long, 0.5–0.6 mm wide. Ray florets ca 20 per head; corollas 10.0–11.0 mm long, 2.0–3.8 mm wide, 2- or 3-lobed with no basal lobes present. Disc florets ca 50 per head; corollas 4.1–4.2 mm long, 0.6–0.9 mm wide, glandular. Ray achenes 1.0–1.6 mm long, 0.6–0.7 mm wide, glabrous. Disc achenes 1.5–1.6 mm long, 0.5–0.8 mm wide, glabrous.

Distribution (Fig. 2): Known from only two collections, from barrancas in the Guadalajara region, along Rio Grande de Santiago (*Pringle* in 1891 and 1895). I have looked on two occasions for this taxon, both in the vicinity of the type locality and in the general region of the Rio Grande de Santiago, and have not been able to find it. Neither has *McVaugh* collected this species, even though he has collected extensively in the region. Flowering Sept.–Oct.

Additional specimens examined: JALISCO: wet sandy banks of Rio Grande de Santiago, barranca near Guadalajara, 12 Oct 1895, *Pringle 7367* (F, MO, UC).

2. **HYBRIDELLA GLOBOSA** (Ort.) Cass., Dict. Sci. Nat. 22:86. 1821.

Herbaceous perennials with one to few stems arising from a woody caudex. Plants to 0.6 m tall; stems striate, glabrous below to hispidulous or hirsute above. Leaves sessile, obtrullate in outline, 4-pinnatifid, ulti-

FIG. 2. Distribution of *Hybridella*.

mate segments less than 1 mm broad. Lower leaves 7.4–18.5 cm long, 1.5–6.0 cm wide; upper leaves 1.6–5.3 cm long, 0.5–2.5 cm wide; pubescence of upper surface usually limited to the veins, lower surface hispidulous to strigose. Heads one to several, solitary on peduncles 2.5–13.5 cm long; 1.6–3.2 cm wide including the rays. Involucre of 2–3 series of lanceolate to ovate-lanceolate bracts; outer series 3.8–6.7 mm long, 1.3–2.8 mm wide; inner series 3.3–5.9 mm long, 0.7–2.4 mm wide; both pubescent with simple, multicellular hairs. Pales linear-lanceolate to oblanceolate, 2.0–3.9 mm long, 0.2–0.5 mm wide. Ray florets ca 20 per head; corollas 7.2–11.7 mm long, 1.5–2.8 mm wide, ligules 2-lobed, usually with two small lateral lobes and one central lobe at base, tube glandular. Disc florets ca 100 per head; corollas 2.2–3.1 mm long, 0.4–1.5 mm wide, tube glandular. Ray achenes 0.9–2.2 mm long, 0.4–0.7 mm wide, glabrous to sparsely pubescent along the angles. Disc achenes 1.0–2.4 mm long, 0.4–0.8 mm wide, glabrous to sparsely pubescent. Chromosome number $n = 16$.

Distribution (Fig. 2): Mexico, in moist soils from just north of the city of Durango, south and east into the Federal District, Hidalgo, Mexico, and Queretaro. Flowering Jun–Sep.

2a. *HYBRIDELLA GLOBOSA* (Ort.) Cass. var. *GLOBOSA*.—*Anthemis globosa* Ort., Nov. Rar. Plant. 46. 1797.—*Hybridella globosa* (Ort.) Cass., Dict. Sci. Nat. 22:86. 1821.—*Chiliophyllum globosum* (Ort.) DC; Prodr. 5:554. 1821.—*Zaluzania globosa* (Ort.) Sch.-Bip., Flora 44: 564. 1861.—TYPE: not seen, presumably a Sessé collection in MA.

Variety *globosa* is characterized by its glabrous or hispidulous stems, hispidulous to strigose lower leaf surface, acute ultimate leaf segments, more than 2 mm long, linear-lanceolate receptacular pales, and the inner series of involucre bracts, which are pubescent over the entire abaxial surface. This variety is found growing on moist soils of the Federal District, Hidalgo, Mexico, and Queretaro.

Specimens examined: DISTRITO FEDERAL: Valley of Mexico, champs incultes, 12 Jun 1865, *Bourgeau 385* (GH, US); Valley of Mexico, 24 Jun 1887, *Pringle 2925* (GH); low meadows, Valley of Mexico, 27 Jun 1890, *Pringle 3204* (F, GH, LL, MO, NY, UC, US); damp meadows, Valley of Mexico, 7300 ft, 25 Jun 1897, *Pringle 7440* (US); wet meadows, Valley of Mexico, 7300 ft, 7 Jun 1901, *Pringle 9395* (GH, MO, US); near Tlalnepantla, 20 Jun 1901, *Rose & Hay 5247* (US); near Tacuba, 30 Jul 1901, *Rose & Hay 5816* (US). HIDALGO: Real del Monte, Jul 1946, *Martinez 15308* (MO); bosque bajo ladera calcarea, C. de los Pitos, 2690 m, 22 Jul 1951, *Matuda 21494* (NY); swales and ditches, vicinity of Tulancingo on road to Pachuca, 13 May 1947, *Moore 2811* (MICH); ditches and roadsides between Tepetates and Acopinalco on road from Tepeapulco to Apan, 21 Jul 1947, *Moore 3443* (GH); Telles, 21 Sep 1910, *Orcutt 4139* (F, GH, MO); along rt. 85 ca 20 mi N of road to the pyramids (Rt. 30), 10 Aug 1961, *Powell & Edmondson 597* (F, LL); Pachuca, Jul 1903, *Purpus 77* (MO, UC, US); Sierra de Alcaparrosa, 5 km al NW de Tepozolan, 29 Jul 1971, *Rzedowski 28247* (LL, NY, US); 2 mi W of Tulancingo, 29 Aug 1965, *Torres 1709* (MICH); N shore of Laguna de Apan, 4 km NW of Apan, 19 Jul 1966, *West R-12* (MICH). MEXICO: near Tlalnepantla, 6 Jul 1905, *Rose et al. 8417* (US); Mexico, *Schmitz 2246* (GH). QUERETARO: 10 mi E of Palmillas on Mexico 45, 14 Jul 1971, *Sanderson 258* (LL).

2b. *Hybridella globosa* (Ort.) Cass. var. *myriophylla* (Sch.-Bip.) Olsen, comb. nov.—*Zaluzania myriophylla* Sch.-Bip., Flora 44:565. 1861.—*Zaluzania globosa* var. *myriophylla* (Sch.-Bip.) W. M. Sharp, Ann. Missouri Bot. Gard. 22:103. 1935. TYPE: Mexico, Aguascalientes, low places, *Hartweg 111* (Isotype: GH!).

Variety *myriophylla* (Fig. 1 a-d) is characterized by hirsute stems, hispid lower leaf surfaces, rounded or obtuse ultimate leaf segments less than 2 mm long, oblanceolate receptacular pales, and the inner series of involucre bracts, which are pubescent only along the margins. This variety is a more northern element, being sympatric with variety *globosa* only in Hidalgo and the Federal District. Where sympatric, the two varieties remain distinct with no mixed populations found and no evidence of hybridization.

Specimens examined: AGUASCALIENTES: 31 mi N of Aguascalientes, 24 Aug 1953, *Manning & Manning 531252* (GH). DURANGO: in moist low soil about 16 mi NE of Durango, rt 31, 25 Jul 1958, *Correll & Johnston 20163* (LL); 8-9 mi NE of Ciudad Durango near Rio Mesquital, 1 Oct 1948, *Gentry 8568* (GH, MICH, UC); in the vicinity of Durango, Apr-Nov 1896, *Palmer 307* (F, GH, MO, NY, UC, US); in grassland 5 mi SE of Victoria, 26 Aug 1939, *Shreve 9172* (ARIZ, GH). HIDALGO: 3 km W of Tezontepec, 14 Jun 1963, *Rzedowski 16718* (MICH, US). JALISCO: near km 57, just E of the Aguascalientes state line, road from Ojuelos, ca 13 mi W of Paso de la Troje, 16 Aug 1958, *McVaugh 17053* (LL, MICH, NY, US). MEXICO: Tlalnepantla, 15 May 1904, *Pringle 13092* (ARIZ, F, LL, MO, US); San Juan Teotihuacan, 1 Jun 1973, *Rzedowski 30174* (MICH). SAN LUIS POTOSI: region of San Luis Potosi, 1878, *Parry & Palmer 527* (F, GH, MO, NY, US); Laguna Seca, km 20 carretera San Luis Potosi-Antigua Morelos, 30 Aug 1955, *Rzedowski 6302* (LL); San Miguelita, Sep 1876, *Schaffner 345 & 770* (GH, NY, US). ZACATECAS: 2 mi SW of Zacatecas-San Luis Potosi state line along hwy 80, 23 Jul 1969, *Biernier & Turner 116* (LL, NY); 6 mi W of Ojo Caliente, 6-8 Sep 1938, *Johnston 7454* (GH); 9 mi S of Fresnillo, 20 Aug 1956, *Linsdale 56-F1* (UC); 9 mi S of Fresnillo, 9 Aug 1954, *Linsley, MacSwain, & Smith 1* (LL, UC); 15 mi N of Zacatecas on hwy 45, in La Joya, 3 Sep 1975, *Olsen 265* (LL); Frio, 23 Aug 1934, *Pennell 18115* (US); damp hollow plains of Calera Station, 1 Sep 1904, *Pringle 8914* (F, GH, LL, MO, NMC, NY, UC, US).

ACKNOWLEDGMENTS

I thank Dr. B. L. Turner for critically reading and discussing the manuscript and the curators of the following herbaria for loans of materials: ARIZ, F, GH, LL, MICH, MO, NMC, NY, UC, US.

LITERATURE CITED

- BUTTERWICK, M. L. 1975. A systematic treatment of series *Pinnatilobatae* of *Viguiera*. M.A. Thesis, Univ. Texas, Austin.
- CASSINI, A. 1821. Dict. Sci. Nat. 22:86. (Reproduced in R. M. King and H. D. Dawson, 1975, *Cassini on Compositae* Vol. 1, 454. Oriole Editions, Inc., Sentry Press, New York.)
- OLSEN, J. S. 1977. A systematic study of the genus *Zaluzania* (Asteraceae: Heliantheae). Ph.D. Thesis, Univ. Texas, Austin.

- POWELL, A. M. and B. L. TURNER. 1963. Chromosome numbers in the Compositae VII. Additional species from the southwestern US and Mexico. *Madroño* 17:128-140.
- ROBINSON, B. L. and J. M. GREENMAN. 1899. Revision of the genera *Montanoa*, *Perymenium* and *Zaluzania*. *Proc. Amer. Acad. Arts* 34:507-534.
- SHARP, W. M. 1935. A critical study of certain epappose genera of the Heliantheae-Verbesininae of the natural family Compositae. *Ann. Missouri Bot. Gard.* 22:51-153.
- STUESSY, T. F. 1976. A revised subtribal classification of the Heliantheae. *In* V. H. Heywood, J. B. Harborne, and B. L. Turner, eds. *The biology and chemistry of the Compositae*. Academic Press, London (in press).
- TURNER, B. L. 1976. Fossil history and geography. *In* V. H. Heywood, J. B. Harborne, and B. L. Turner, eds. *The biology and chemistry of the Compositae*. Academic Press, London (in press).
- YATES, W. F. 1967. Taxonomic studies in the genus *Heliomeris* (Compositae). Ph.D. Thesis, Indiana University.

A REVISION OF LINANTHUS SECT. SIPHONELLA (POLEMONIACEAE)

ROBERT PATTERSON

Department of Biology, Occidental College, Los Angeles 90041

Linanthus comprises nearly 40 species and is one of the larger genera in the Polemoniaceae. Four species are suffrutescent perennials, and the rest are annuals. The genus is distributed throughout much of western North America, with one annual species indigenous to Chile. In spite of the size and relatively widespread distribution of the genus, it is one of the least examined in the family from a taxonomic viewpoint.

The four perennials constitute one of the least understood groups in *Linanthus*. These plants were first described by Gray (1870) as two species, *Gilia nuttallii* and *G. floribunda*. Milliken (1904) recognized these two taxa as members of *Linanthus* on the basis of their palmately-lobed leaves. A number of subsequent authors (McMinn, 1939; Munz, 1958; Grant, 1959) were basically in accord with Milliken, while others regarded this complex as belonging in related genera such as *Leptodactylon* (Rydberg, 1906; Jepson, 1925; Tidestrom, 1935) *Navarretia* (Kuntze, 1891), *Siphonella* (Heller, 1912; Jepson, 1943), and *Linanthastrum* (Ewan, 1942; Wherry, 1945) or retained it in its original genus, *Gilia* (Brand, 1907). In addition to these varied generic interpretations, a number of species, subspecies, varieties, and forms have been recognized and named. These will be considered in greater detail in the taxonomic treatment that follows.